GARDEN AND FOREST.

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Trees in Public Parks.

THE determination of the selectmen of the town of Winchester, Massachusetts, to remove a row of large Elm-trees which encroach on the principal street of the town, has met with such a storm of opposition among the inhabitants, and has been so generally condemned by the press of the state, that this particular row of trees will probably continue to shade the Winchester highway. This vigorous protest against cutting down these trees, which we have reason to believe is entirely justified by the peculiar circumstances of the case, represents the usual attitude of Americans toward the trees on their public grounds. They object on general principles and on all occasions to cutting down a tree, without stopping to consider whether it should be cut or not, and therefore often insist that trees should be left standing when really they ought to be removed. Park commissioners and other officers charged with the care of public grounds frequently try to defend themselves against charges of neglect of duty in such matters by entrenching themselves behind the public sentiment against the cutting of trees, which they claim is often so strong that they are helpless to act. Every expert, for example, who visits Central Park, in this city, sees that the excessive crowding of the trees is rapidly destroying their beauty and threatening their lives, and that hundreds of trees should be cut out at once in order to maintain the park in good condition. This has been explained year after year, and from time to time the park authorities have removed occasional trees here and there, but such work should go on steadily and constantly, and in a great pleasure garden like Central Park the axe should never be allowed to rest. The feeling against cutting a tree is, however, so strong in this community that it is exceedingly difficult for commissioners to accomplish any systematic work in this direction. If, however, the importance of this matter was once clearly understood, the public would not only uphold but demand these operations, and it is, therefore, one of the plain duties of Park Boards and their subordinates to instruct the people on this subject by object-lessons and in every other possible way.

We allude to Central Park because it is visited yearly by many people who see for themselves the need of prompt action with the axe in order to develop its greatest possibilities and beauty, and because we have been somewhat familiar with the workings of its management, but the same thing can be said with nearly equal truth of the condition of the plantations in all American parks. In Prospect Park, Brooklyn, the thinning of the border plantations has been so long delayed that their usefulness has gone, and they must be renewed at a very large cost and the loss of twenty-five or thirty years. In the Buffalo park the trees, about twenty-five years old, are everywhere crowding themselves out of shape, and, unless steps are taken to relieve them at once, the beauty of these plantations will be ruined forever. This condition of things exists also in the parks of Chicago and St. Louis, and in Druid Hill Park, Baltimore, and Fairmount Park, Philadelphia, where many old trees have been allowed to die prematurely through the neglect to apply simple remedies of preservation. Boston, however, enjoys the reputation of having the worst trees in its parks of any American city. The city has spent millions in securing park lands and in building elaborately constructed park roads and expensive park buildings, but little or nothing has been done for the trees which were growing on these lands; these are overcrowded, unshapely, full of dead and dying branches, and are harborers of dangerous insects, which spread from the parks into adjacent lands.

This general neglect of the trees in public parks in American cities cannot be explained by the excessive love felt for trees by the public, as park officers often assert. The cause must rather be looked for in the general indifference of Americans to their trees, and in the unfortunate fact that the tendency of American park makers in recent times is more to the perfection of park drives and walks and to the erection of expensive buildings, retaining-walls, bridges and other masonry structures, than to the care and maintenance of plantations. It is easier to lay down the lines of a gracefully curved driveway and to get it satisfactorily built than it is to make and maintain a good plantation of trees; and the thorough knowledge of trees which is essential for good park-planting, comes only from long study and special powers of observation. But, on the other hand, park makers and park commissioners must remember that a road, a bridge or a building can be completed in a single season, and that only a few months are required to change the roughest piece of ground into a smiling lawn, while it takes the best part of a century to bring a tree to perfection, and that this perfection can never be obtained if it is allowed to remain neglected during any considerable period. Roads and walks and buildings of all sorts are needed in parks to make them available for public use, but they are necessary evils to be subordinated as far as possible to the natural features which give them their real value. The most important of these natural features are the trees, and parks are beautiful and useful as they are furnished with good trees; it is certainly to be deplored that the modern tendency in park management is to do everything else in a park but care for the trees, which, as we have already said, are not only the most essential features of a park, but the most difficult to obtain. Experts in the care of ornamental trees are sadly needed in the United States, and if they can be found the managers of our parks singularly neglect their duties if they fail to avail themselves of the technical knowledge of such men.

The New York Traffic in Christmas Greens.

THOUSANDS of closely tied Christmas trees piled up in the wide street space before the dock and ferry entrances along West Street have indicated for a fortnight past that the holiday season is at hand. One who would visit the principal seat of another branch of Christmas industry must leave the West Street car at the picturesque fronts of the Gansevoort markets, and, passing the whole

sale meat and live-fowl section to the river, he will find the Magenta, a steamer which sails each afternoon for Keyport, New Jersey. The voyage costs but fifty cents for the sail out and return, and offers the beholder one of the world's most magnificent spectacles of sea and shore. Leaving the palisades, the shipping along shore, the city, the harbor islands, the forts at the Narrows and the quarantine stations, the purple haze over the brown hills and red fields of Staten Island and New Jersey comes into view. Outgoing ocean steamers pass to the east, the sails of anchored fishing boats catch and reflect the afternoon sunlight, while others are dull gray in the early twilight. The stretch of water crossed in the southward course is smooth or rough, as is the open sea to eastward. Entering Raritan Bay the steamer advances between forests of slender stakes which mark out oyster beds. At the head of the bay is Keyport, from which place the first Christmas greens were shipped to New York more than a half century ago, and this section is still the chief seat of the trade. A representative of the third generation of one of the two or three families who started the industry is now in the business, his energetic ancestor a man-of-war's man of 1812, and, later in life, keeper of the shore Waackwaack lighthouse at Keanesburg. The first consignments were tied up in sheets and carried to market with farm produce on old-style sailboats with lee boards on the outside. Strong head winds made a wait of perhaps a couple of days necessary in the Kills off Staten Island, and the voyage not infrequently took a week. The early trade was altogether in loose branches of White Pine, Holly, Laurel and Hemlock, and in plants of the Club Mosses, and the gatherings were piled up during late autumn in successive loads until the houses were nearly hidden behind stacks of boughs. Churches were large buyers, the members of the congregations making the designs. Bouquets of berried Black Alder and Ground Pine were the first arrangements, and gradually the trade in made pieces grew. Paper flowers were the first bits of bright color introduced, and fifteen years ago immortelles were adopted. The latter are still in general use, besides dyed Cape flowers and Balsam, or Everlasting (Gnaphalium), and sometimes the colored plumes of the grass locally known as Quill weed, some Bitter Sweet and Holly berries.

For a mile back from the shore of the bay, the entire length of Monmouth County, nearly every household is now engaged in the making of Christmas greens, which include stars, wreaths, hearts, anchors, crosses, triangles and horseshoes, besides great quantities of roping. Keanesburg, four miles from Keyport, is the busiest section, where neighbors are alluded to as "making" or "not making," according to whether the family is manufacturing greens at home or some members are engaged in the work in near-by houses. The door-yard sweepings of waste bits of the greens and bright immortelles mark these busy houses. Detached summer kitchens are usually the workshops. Continuous tables are built along the sides or extend through the middle, and before piles of Princess pine, box, laurel, moss, holly, hemlock, immortelles, Cape flowers and native balsam, young girls work. The social instinct contributes no little to the trade, for the workers come from comfortable homes, many of them established by early-settler ancestors, and their education and conduct are unmistakably good. The makers realize, perhaps, the most satisfaction out of the busy season of eight or nine weeks which follow election day, in being able to give Christmas gifts more freely, in procuring luxuries for themselves and in the general festivity of the entire working season. Gay chat and open confidences characterize the daytime, and in the evenings groups of wholesome young men, who are boat-builders or who "follow the bay" as oystermen or fishermen, visit one or more of the work-rooms, and a couple of evenings during the busy term are snatched for a neighborhood dance. The evening visitors render little services in sharpening a dulled knife, cutting the roots off of bunches of "balsam," filling up the tables with stock, with a care not to give poor material from the bottom of a sack to a favorite, unrolling and cutting cord into suitable lengths which is tied about a waist in a loose coil, and sometimes one of these hearty, bronzed young fellows will even "make" and add the finished pieces to the day's work of a pretty neighbor.

Since the great increase of the trade during the past ten or twelve years, and the consequent competition in prices, wages have been much reduced, and enough workers cannot always be secured from among the thrifty fisher folk and farmers near by. Through the extermination of needed materials in northern New Jersey, and consequent excursions southward to Barnegat and Toms River, some workers have come from those sections, and thus the business is spreading to remote points. The workers from other places are boarded, have their laundry work done and receive set weekly wages. Near-by workers are paid by the piece, and while the rates do not sound alluring to the city wage-earner, they are, nevertheless, all that the manufacturer can afford to pay. For making wreaths and other small and plain pieces eight cents a dozen is paid, and for stars, anchors, etc., twenty cents a dozen; four dozen of the more elaborate pieces is a steady and long day's work, from 7 or 8 o'clock in the morning until late in the evening. For making the ordinary grade of flat roping thirty cents is paid for a hundred yards. Two hundred yards a day requires accustomed fingers, though 400 yards is not an unusual achievement, and a lad last week accomplished 800 yards in a day of thirteen working hours. Sixteen years ago $2.00 a dozen was paid for making stars of holly, and even more for special orders, while $1.50 to $2.25 a hundred yards was earned by making the flat roping, and $4.00 for heavy round roping. The business has seen even greater changes, however; formerly Ground Pine, Princess Pine and Laurel were abundant hereabout, and the best Holly might be, not too openly, gathered by day on the Government lands at Sandy Hook and carried away in sloops after sunset, costing only the labor. Even Mistletoe was comparatively plentiful on old Sour Gum trees in the swamps near Freehold. Now almost nothing is collected from home fields except the so-called Balsam, and long trips must be made for the nearest laurel and holly. Commission houses in New York sell loose stock to these Monmouth County manufacturers, which has been shipped from the New England and southern states, and one of the largest and longest-established manufacturers, Mr. Robert Seeley, of Keanesburg, makes personal trips during October of each year into a half-dozen states to secure all the stock he needs. Of Princess Pine alone forty tons was used about Keanesburg this season, and this costs $60.00 a ton in New Hampshire and Vermont. With $12.00 added for freight, besides cartages, shrinkage and waste, the cost is nearly $80.00 a ton for this raw material. As much as ten cents a pound has been paid for Princess Pine to fill orders after regular supplies were used. Holly is each year becoming more scarce, and further invasions are made into southern New Jersey, for, while many crates and barrels of holly from Delaware, Maryland and Virginia are sent to the New York wholesale dealers, this is necessarily cut in short lengths. The branches and tree-tops from New Jersey intended for decoration are larger and are not crated. A two-horse wagon-load of well-berried holly could be bought in New Jersey three years ago for $25.00. Last year $75.00 was paid for the same quantity, and gray moss, of which none is left in the northern part of the state, costs double the price of a few years ago. The best laurel roping, round and heavy, now sells for ten cents a yard on special order, whereas years ago there were standing orders from season to season at thirty cents a yard, with the rope and twine furnished in addition. For the cheaper roping no hemp rope is used, the overlapping stems making the foundation. Cultivated Arbor-vitæ is bought from nurseries, and native plants are shipped down the Hudson. A nursery stock of 100,000 Juniper-trees was secured by a dealer and used gradually in a few

seasons. Box is industriously sought out, and the trimmings well paid for, while occasionally whole door-yards full of box edgings with the plants of Tree Box on old estates are bought outright and cut off above the roots.

The cost for freightage is considerable. For a dozen wreaths two cents freight is charged on the steamer, and for stars four cents, while the light roping costs fifty cents for 1,000 yards, and heavier roping $1.00 for the same quantity. A dealer whose season's output amounts to 92,000 yards of roping and above 40,000 pieces, and who this year used ten tons of Princess pine, besides other materials in proportion, last year paid $400 for freight of raw goods and manufactured articles. As many as 12,000 to 15,000 yards of roping and 150 dozen pieces are sometimes hauled to the boat by a single dealer for one day's shipment to this city.

Some of the materials come from as far west as Chicago, and not a few of the made pieces go to Boston, and even into New Hampshire, where Holly is especially salable. Hemlock is no longer in general favor on account of its poor keeping quality. Much of the Princess pine this year comes from sections in New Hampshire and Vermont not previously picked over, and as there were no heavy early snows the collecting was easy and the color excellent. Laurel, too, is good, and without disfiguring spots, but the leaves of Holly are not as perfect as in recent years, nor are the berries as plentiful.

No little capital is invested in the trade, and the preparation begins in September, when the balsam is gathered before it is too ripe and touched by frosts. During autumn this is dyed, as are large quantities of Cape flowers, and dried out-of-doors. Sometimes the natural colored immortelles are dyed at home, but they are usually bought in bright hues from the importers. Quantities of laths are sawed in suitable widths in the mills and made up into stars and other designs at home, and "whips" are gathered in the woods for wreath-frames. Rattan is also largely used for horseshoes, hearts and anchors. Little bunches of the dyed flowers, fastened to toothpicks with wire, have to be prepared in advance. On the arrival of the first stock in November it is taken out of the sacks, shaken out in sheds or storehouses, wet and assorted, the brown and dull-colored Lycopodium being put aside for cheap roping. This is dipped into scalding green dye the day before shipment after it is made up. German buyers prefer the artificial green roping, and two city dealers who have this class of customers sell 10,000 yards of this grade. There is good and poor work in this business as in others, and manufacturers with established reputations have earned them by exacting careful work from the makers in the removal of tiny spikes or cones from the Lycopodiums and in well-overlapped twigs, so that no stems show and there are no scant spots. The roping is measured off and tied in twenty-five-yard lengths and the pieces in packages of a dozen. Pieces made of holly, a specialty in Keyport, must be stored during the few weeks before sales begin in cool and dark rooms and wet every day. The other greens are freshened with water just before shipment. A plentiful sprinkling of Princess pine pieces and roping with scalding water, which is allowed to freeze and then thaw out on the boat, freshens the stock up wonderfully. Until a fortnight before Christmas the shipments are comparatively light and only of special orders, mainly for public places, as florists' shops, markets and saloons. One of the department stores used 12,000 yards of roping in its decorations put up three weeks ago. Since Monday a week ago the Magenta has been closely packed with the greens, even in the passengers' saloon. The prices this year are not high; small wreaths of the more plentiful greens cost thirty to fifty cents to the wholesale buyer on the boat, and stars $1.00 a dozen, while roping ranges from $1.50 to $10.00 a hundred yards. Holly is more costly. Set pieces made of cedar, moss, etc., for novel effect, do not find popular favor, and are usually closed out at a loss.

New York. *M. B. C.*

The Value of Bud Varieties.

EVERY bud on a tree may produce a new variety of fruit just the same as every seed does. There is no difference between a bud variety and a seedling, except in degree. A variety in horticulture is simply a variation from the type which produces it and which is sufficiently marked to allow of description. The determination of the value of the variation depends entirely on the judgment of the operator who names it. Varieties are not special creations but normal variations in a plant which can be propagated with profit. To one mind the variation must be very apparent to justify the formation of a new variety; to another a slight difference may seem of equal value, and thus it is that many varieties differ only in minor points. If the various parts of a tree are studied, one is impressed with the unlikeness of its branches, its foliage, perhaps its fruit, which may differ in color, shape, size or time of ripening. In fact, no two apples on a tree are exactly alike, but a slight difference will appear in each on close examination. The tree is composed of a collection of individuals or buds, no two of which are surrounded by the same environment.

These slight differences have never been used as a starting-point in the improvement of existing horticultural varieties. In fact, a variety of fruit, after it once appears, is accepted and propagated without thought of systematically improving it. Animals are improved by careful selection of parents through each generation and a corresponding regard for the improvement of their environment, so that any gain in good qualities may be maintained and new ones started, but the improvement in orchard fruits is looked for through the introduction of entirely new forms.

It seems strange that the slight differences which appear in the buds, and are manifested in the variations in the fruit, should not have been more generally used as the foundation for the systematic improvement of orchard varieties. The fundamental principle of the Van Mons system of originating varieties rested on the selection of favorable differences in the seedlings through each generation, and it is the one broad principle underlying the operations of all plant breeders in building up new types. The ordinary method of continuing varieties by the promiscuous selection of scions and buds is not accompanied by a gradual betterment of the variety, but results in orchards with trees that always bear, in trees that never bear, and trees that sometimes bear. Improvement in horticulture should rest on the same general laws which have operated in the gradual evolution of the organic world, and that has ever been by the slow but progressive improvement of existing types.

Those marked variations in buds, however, which are particularly noticeable, are eagerly grasped after by florists, and they have been the source of several prominent orchard varieties. These variations are called sports, and a sport is a bud whose difference from other buds is greater than the ordinary differences which constantly occur. Among the fruits which have originated as sports are the Isabella Regia Grape of California, a sport of the Isabella, which has larger branches and is propagated in that state as a table grape with more profit than the other American or Vinifera types; the Hero and Storm King are sports of the Concord, though neither has been valuable; Cannon's Early Peach is a sport from the Mountain Rose, which is ten days earlier, larger, more highly colored, and is now quite extensively propagated in Delaware; Bank's Gravenstein of Canada is a sport of the Gravenstein Apple, and promises to replace its parent in many sections; the Peento Peach of Florida often bears fruit with the common flat form of its parent and an oblong point; the Golden Queen Raspberry is a sport of the Cuthbert, having originated in Berlin, New Jersey.

The list of bud varieties could be further extended and several hundred varieties of flowers named. I simply mean to point out that bud varieties often originate through

violent variation in buds, and that these sports are often of value. But to depend on sports for new varieties is as much of a lottery as to wait for a good seedling to turn up. Only one in a thousand is ever of value as a variety. Is it not reasonable to believe that if horticulturists were to take the slight variations presented in the trees of our best varieties as the starting-point for the improvement of existing varieties and propagate them by judicious selection in each succeeding generation, that a marked improvement would result in all of our best types of fruit?

Experiment Station, Newark, Del. *G. Harold Powell.*

Foreign Correspondence.

London Letter.

Eulophiella Peetersiana.—Under this name some imported Orchids were offered for sale at Messrs. Protheroe & Morris's auction-rooms lately. They are described by the venders, Messrs. F. Sander & Co., as "a glorious novelty sent home (presumably from Madagascar) by Mr. Mocoris. It is like the recently introduced Eulophiella Elisabethæ. The flowers are large, produced on strong spikes, their color a deep rose. It is a plant of vigorous growth, producing its spikes freely from the axils of the lower leaves." The plants offered were long, stout-branched rhizomes, like those of Iris Pseudacorus, the thickest being two inches in diameter, yellowish white, marked with leaf-scars an inch apart, the upper portion clothed with the sheathing bases of dead leaves four inches in diameter. The flower-scapes are evidently very stout, the remains of them being fully half an inch in diameter, and they are produced from the leaf axils at about four inches from the apex of the rhizomes. I know nothing of the leaves or flowers, but, whatever the plant may be, it is certainly a most remarkable Orchid, and, if a Eulophiella, it should prove an interesting addition to the Orchids already introduced from Madagascar.

Odontoglossum Halli × crispum.—There are numerous so-called natural hybrids among cultivated Odontoglossums, but hitherto the genus has not been operated upon with much success by the hybridizer. The first hybrid raised artificially was O. Leroyanum, the result of a cross between O. crispum and O. luteopurpureum, made by Monsieur Leroy, gardener to Baron E. de Rothschild, Gretz, and flowered in 1890. A second hybrid has now to be recorded, its parents being O. Halli-leucoglossum and O. crispum Cooksoni. It has been raised by Mr. Norman C. Cookson, of Wylam-on-Tyne, who showed it last week and obtained for it a first-class certificate. It combines the characters of the two parents both in color and form of flowers, being cream-white with red-brown blotches, the lip white with a yellow crest and a large red brown blotch in front. It was by far the most interesting hybrid of the many that were shown at the last meeting of the Royal Horticultural Society. It is significant of the importance of hybrid Orchids nowadays that the bulk of new Orchids, and almost all the best, are those that have been raised by the hybridizer.

Cymbidium cyperifolium.—A plant of this rare Himalayan species at an auction sale this week commanded six guineas. It was in an eight-inch pot, and bore an elegant cluster of grassy leaves, with one scape of eight flowers, which are about as large as those of C. elegans, but colored greenish yellow, with brown parallel lines and a whitish lip with a few red spots.

Cattleya Mantini.—This is a hybrid of garden origin, which flowered two years ago in the collection of Monsieur G. Mantin, Olivet, France. It is the result of crossing Cattleya Bowringiana with C. Dowiana aurea. Five plants of it have just been sold by auction and realized from eleven to fourteen guineas each. The pseudo-bulbs are about fifteen inches long, thicker than in C. Bowringiana, and each bears a pair of stout leaves nine inches by three. The flowers are borne several together on short racemes, and are larger than those of C. Bowringiana, of a deep amethyst color, the lip veined with gold.

Cypripedium Baron Schrœder.—A hybrid between Cypripedium Fairreanum and C. Œnanthum superbum. It was shown by its raisers, Messrs. J. Veitch & Sons, and received a first-class certificate, being, perhaps, the prettiest of all the hybrids of Fairreanum parentage. In form it is very elegant, the upper or dorsal sepal is white, shaded at the base with green, and lined and dotted with purplish red. The petals have the downward curve peculiar to the Fairreanum race, and are pale yellow, lined and spotted with purple-brown; the pouch is small, red brown, shaded with green and yellow.

Lælio-Cattleya Decia alba.—Messrs. J. Veitch & Sons raised a hybrid called Lælio-Cattleya Decia in 1894 from L. Perrini and C. Dowiana aurea. They exhibited last week, and obtained a first-class certificate for a white variety of it named as above, and which is a most beautiful Orchid, the flowers being large, intermediate in form between the two parents, and of the purest white in the sepals and petals, the lip rosy mauve, with reticulating whitish lines. Hybrids such as this are really most valuable productions.

Dracæna Broomfieldii.—A new and handsome foliage plant was lately shown under this name by Messrs. F. Sander & Co. at a meeting of the Royal Horticultural Society, and received a first-class certificate. It is evidently allied to Dracæna arborea, a native of tropical Africa, although it is said to have been introduced from the "South Sea Islands" by Mr. J. Broomfield, after whom it is named. The plant shown was about a yard high and two feet through, the leaves gracefully arched, one and a half feet long and two inches wide, gradually tapering both ways and colored rich glossy green, with broad margins of ivory-white and thinner stripes of the same color scattered through the green. The stem is stout and short-jointed, and the leaves are very closely arranged upon it, forming a rather dense head. Apparently the plant retains its color, the oldest leaves being almost as brightly variegated as the youngest. It requires stove treatment. The exhibitors have now a trio of most distinct Dracænas in this plant, D. Godseffiana and D. Sanderiana.

Lowia.—This is a genus of Scitamineæ, with lanceolate acuminate green leaves not unlike those of an Aspidistra. The flowers are borne in clusters about the bases of the leaf-stalks, and in form and color they are not unlike the flowers of some Maxillarias. There are two species, Lowia longiflora and L. maxillarioides, and they are both natives of Malaya. Both have been recently introduced into cultivation, L. maxillarioides to Kew, where it grows and flowers freely in a stove. A figure of it was published in *The Botanical Magazine* in 1894, t. 7351. It has leaves nine inches long and flowers two inches across, the sepals purple and the lip green. L. longiflora has been introduced by Mr. Bull and has lately been figured in *The Gardeners' Chronicle*. It has larger leaves than the other species, and the flowers are composed of three strap-shaped olive-colored sepals three inches long, the two upper petals linear and fimbriated at the tip, with the lower one lanceolate, two inches long and pure white. The genus is not likely to be popular with gardeners, but it is interesting and likely to gratify cultivators of curious plants.

Pterisanthes polita.—Plants of this remarkable Malayan vine are now in flower at Kew. The genus is closely related to Ampelopsis and Vitis, having twining stems, cordate green herbaceous leaves and tendril-like flower-stalks. Its most remarkable character is in the forms of its inflorescence, which is a pendulous flat fleshy receptacle, irregular in outline, about six inches long and an inch in width and colored purple. The flowers embedded on both sides of the receptacle are mostly sessile and hermaphrodite, while on its margins are stalked unisexual or sessile flowers. The fruits are flask-shaped berries containing several seeds. Specimens grown at Kew were recently exhibited before the Linnæan Society, where they were a source of much interest to the botanists.

PRIMULA OBCONICA × SINENSIS.—Mr. E. Hyde, of Ealing, exhibited recently plants which are said to be the result of crossing these two species. Although many attempts have been made to get Primula Sinensis to cross with other species of Primula, hitherto no one has proved successful. And the same is true with regard to P. obconica. Mr. Hyde used the original or type of P. Sinensis, which was introduced from China a few years ago. It differs from the ordinary garden forms in having small, deeply cut, long-stalked leaves and small smooth flowers with reflexed segments colored rose-carmine. The hybrid showed little trace of P. Sinensis, although it differed from P. obconica in the form and color of its flowers. This species, however, shows considerable variation already under cultivation, and I have before seen so-called hybrids between it and P. Sinensis which were nothing more than seedling sports of the former. Primulas, as a rule, do not cross freely. I have tried several times to cross P. Japonica, P. imperialis, P. obconica and P. Forbesii, but have had no success.

London. *W. Watson.*

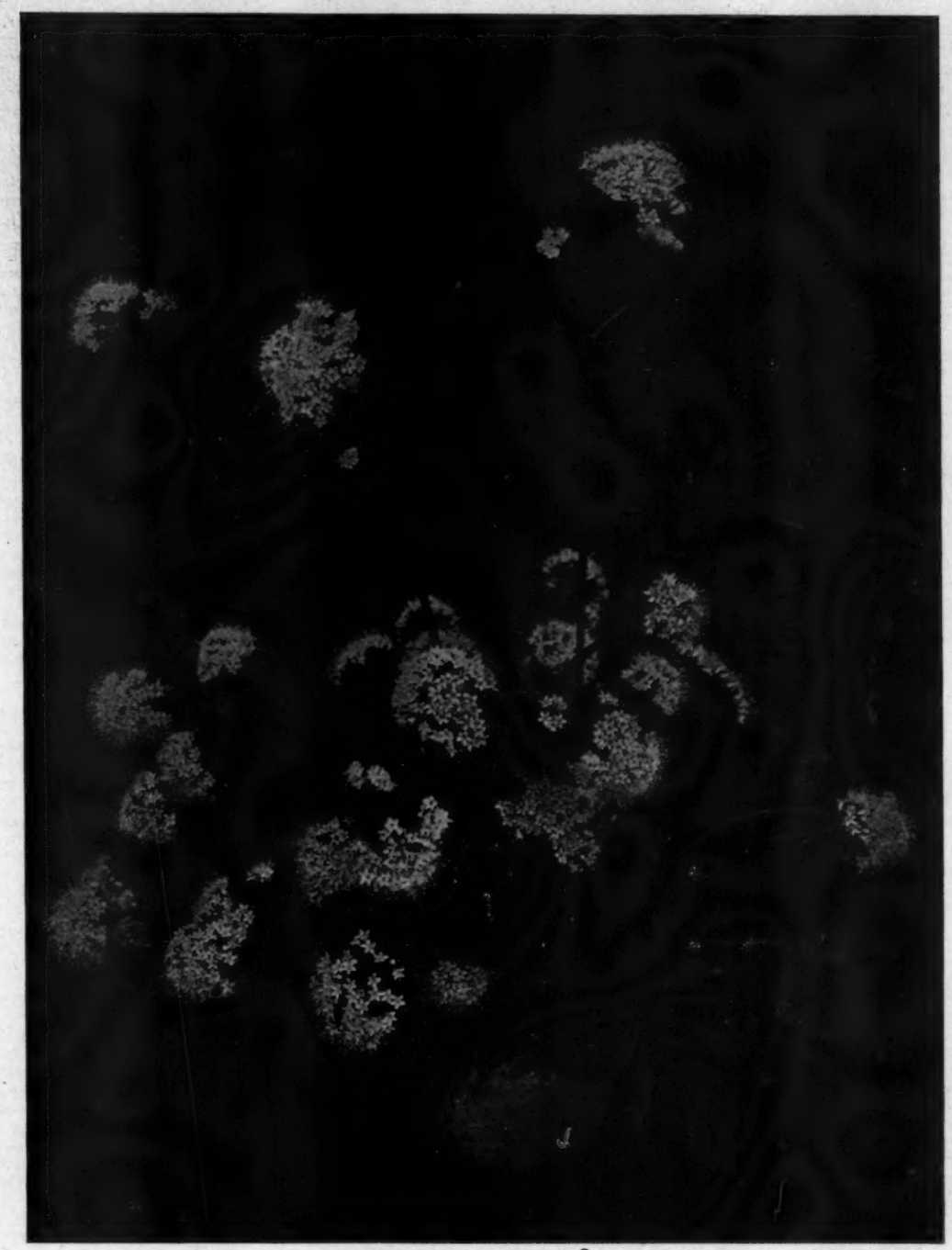

Fig. 74.—Valeriana Sitchensis.—See page 516.

New or Little-known Plants.

Valeriana Sitchensis.

At elevations of five or six thousand feet above the sea on the slopes of Mount Ranier, the great Washington mountain, at the point where the forest has been forced on to narrow rocky ridges in its struggle to maintain itself against the cold of the enormous ice-capped peak, alpine flowers grow in a profusion, variety and luxuriousness which is hardly known elsewhere in the United States. The beauty and abundance of these flowers has given its name to Paradise Valley, one of the best known of these high slopes, as it is the principal camping-place for travelers who wish to try the ascent of the mountain or enjoy the magnificent views which can be obtained from this spot.

Among the Columbines and Gentians, the Dog-tooth Violets and Dodecatheons, the delightful white-flowered alpine Rhododendrons, the dwarf Mountain Ash and the alpine Sedges and Grasses, the Sitka Valerian is conspicuous with its clusters of pale flesh-colored flowers, which possess such a powerful and delightful fragrance that it passes as a Heliotrope among the campers on the mountain.

Mr. Curtis, of Seattle, took a number of photographs last summer in this valley, among them a bunch of this Valerian, which is reproduced on page 515 of this issue. We are unaware if any attempt has been made to grow this plant in gardens, or whether this inhabitant of high northern countries and mountain slopes could be induced to bear the conditions of a lowland garden. The attempt to cultivate it, however, is certainly worth making, as it is one of the most delightful flowers of the far northwest.

Cultural Department.

Selaginellas.

A few of the more common sorts of this extensive genus are generally found in most greenhouses, but a considerable collection of them is rarely seen in private gardens. Even in the commercial places they are not so generally grown as their decorative qualities and comparatively easy culture seem to warrant.

The most extensively and most easily grown species is the moss-like Selaginella Kraussiana, which is so well known that description is needless. Apart from being grown as individual plants in pots or pans, there appears to be no end to its uses, such as for covering the surface of pots or tubs around Palms and other plants; for hanging baskets, for planting around the edges of beds and rockeries; as a ground-work for covering unsightly walls in greenhouses, where it grows freely in sphagnum-moss held to the wall by means of wire netting. There is a golden form, S. Kraussiana aurea, and one with the points white-tipped, called Variegata, which is the most delicate of the three, and is somewhat subject to damping, on which account it should not be watered overhead.

To have fresh healthy plants of any of these varieties it is necessary to renew the pots or pans every three or four months by filling with fresh soil and inserting small tufts of the fresh points, some two inches apart, all over the surface. A suitable soil is composed of well-rotted sod, leaf-mold and sharp sand in about equal parts. The variety known as Brownii also appears to be a form of the above species, but is somewhat harder to handle than any of the foregoing, and is probably most useful when confined to small pots, and requires a lighter and more open soil. We have found a fair percentage of cocoanut-fibre refuse mixed with the soil of great advantage in growing this plant.

The neatest and most compact of all the dwarf-growing forms is the beautiful little Selaginella densa, which forms a cushion of lively green, and only grows about one inch high. It is sometimes a little hard to establish, but once started it grows freely, and keeps in good condition for several months without renewing. S. Martensii is a free-growing and very useful species, requiring much the same treatment as those described above, but less frequent shifting, and, as it is of stronger growth, it should be planted in larger pans, where it will make nice specimens about nine inches in height. There are several varieties of this, including a variegated form. S. involvens is another pretty species which also includes a variegated form; the average height is about four inches, and the habit of the plant symmetrical and compact, and this, like all the foregoing, requires a greenhouse or intermediate temperature, plenty of water at the roots, but as little overhead as possible, especially during dull weather, when all of them are more or less susceptible to damping.

The Selaginellas which require stove or warm-house treatment are for the most part larger, though slower, growing species, and require much the same treatment as Ferns. The most convenient method of propagation is by division, rooted portions of the creeping stems being easily procured. Most of them can also be increased by layering of the leaves. Some varieties, such as S. Emaliana, propagate themselves very quickly. If the pots are set on a bed of sand or ashes, small particles of the leaves get broken off; these, being very brittle, quickly make roots in the sand and form little plants all around the pots. The species and varieties of this class are so numerous that only a few of the best may be named here. These include S. tasselata, a first-rate sort; S. Victoriæ, S. grandis, S. hæmatoides and S. flagellifera.

The climbing species, Selaginella Wildenovii, is another well-known form well worthy of a place in every warm greenhouse. To bring out the true metallic blue tint of the foliage it should be grown in a well-shaded situation. S. uncinata also attains a bluish tint under similar conditions. This is a very desirable trailing variety, which, if subjected to somewhat cool treatment, can be partially dried off and rested during the winter months and started up again in spring.

Tarrytown, N. Y. *William Scott.*

Late Chrysanthemums.

Mrs. Joseph Thompson is the most beautiful white variety, early or late, which I know. It is an irregularly incurved Japanese of extremely graceful form. It seems to me an ideal Chrysanthemum, not too dense, but with enough florets to make an even globular flower. The upper florets turn in at the tips, leaving just a trace of an opening, where the centre of the bloom should be, but this is completely obscured. The lower petals interlace the stem for two or three inches. The foliage is bold, of firm texture, and although the stem is stiff it is in no way objectionable. The whole plant is healthy and of low growth. It has been in bloom for a month and scarcely yet shows traces of age, except the faintest tinge of pink, and this really adds to its beauty.

Mrs. Emil Buettner, a charming yellow, is equally beautiful, though quite different. This also is a plant of low, stocky growth and of perfect constitution. The bloom lasts a long time in full beauty. It is pleasing to watch the changes the flower undergoes. In the bud stage it is very full, slow in opening, and expands rather flat and radiating, with straight, delicately pointed, strap-shaped petals, broadening and deepening to orange color at the base. The florets elongate from the centre until the bloom is perfectly globular. As the flowers develop, the petals become elegantly twisted and pass from a clear yellow to a straw color, a bloom quite different in build and color from that suggested in the earlier stages.

Mrs. S. T. Murdock is a lovely pink flower of a different form. It is reflexed and less graceful than the two varieties already described. Besides being late, it is valuable on account of its unique coloring. It is extremely lustrous. The surface of the florets is completely covered with crystal-like lenses, which refract the light. For decorations under electric light it is singularly effective. The plant is of luxuriant growth, a perfectly free bloomer, and can always be counted upon to produce a perfect bloom, no matter what bud is taken.

C. B. Whitnal ranks as an old variety, though introduced less than ten years ago, and is retained mainly on account of its distinctive characters. It is a Japanese incurved, but so closely built that the English authorities class it with the truly incurved, or what we used to know as "Chinese incurved." The color is maroon-purple, and, altogether, it is the best dark variety for late decorations, taking the place of the crimson-colored varieties, all of which are earlier.

Wellesley, Mass. *T. D. Hatfield.*

Bamboos.

A recent note in Garden and Forest mentioned the hardiness of the Japanese Bamboos in Washington, District of Columbia. They are also hardy farther north. Here, where we have winters which are probably often much more severe on such plants, the roots of the species or varieties which have been tried have stood out without protection about five years, and sometimes the canes have been uninjured. If this were the whole story of the Bamboos, one could

plant them, perhaps, farther north than this with the prospect of gaining in time some novel and striking effects, as these great Grasses are full of character.

Some five years ago I imported a number of species. To be exact, Bambusa Castillonii, B. angulata, B. aurea, B. nigra, B. Quilioi, B. Ragamoskii, B. Simonii, B. viridi-glaucescens and B. palmata, and thought at the time that I had secured some treasures. Here were noble Grasses, normally varying in height from three feet to twenty, and even thirty feet, and they ought to add some novel and striking features to my commonplace garden. The garden is still waiting for the bold effects, my best cultural ability having failed to help the tallest of them to make canes over six or seven feet in height, under which conditions the tall kinds are not at all in character, though, of course, they have some attraction as bold Grasses, and excite some attention on account of their rarity. The cause of their failure to mount and show their true character was rather perplexing at first, but I think it is owing entirely to the dryness of our atmosphere here during the summer. Their native Japan has a warm humid atmosphere during the growing season, and the leaves of the Bamboos are adapted exactly to such conditions, and they do not modify themselves to suit others, as is the case with many plants under cultivation. Bamboos start rather late in the spring and make rapid growth for a few weeks, but as soon as dry weather comes the leaves transpire so freely, the transpiration being unchecked by humidity as in their native habitat, that the nutritive processes are stopped, and the plants fail to make any further important gains. The reason of the failure was not suggested to me until I thought to use some of the growing canes for bold decorations, when it was soon seen that the leaves dried up within an hour or two, though the canes were in water, which would seem to prove excessive transpiration. If any one has grown these plants to specimens in a dry climate it would be interesting to have the details, for it would be a pleasure to be taught that my failure with them is due to some cause or condition that can be remedied.

Bambusa Ragamoskii, being a dwarf plant, was first planted outside, and later removed to a greenhouse, in the humid atmosphere of which it soon took on its true character and broad leaves. No doubt, the taller ones would under similar conditions assume their proper and distinctive features, but this is not hardy-plant gardening.

Elizabeth, N. J. *J. N. Gerard.*

Fertilizers for the Orchard.

AT the recent annual meeting of the Indiana Horticultural Society, a paper read by Mr. W. W. Stevens on the Feeding and Care of Orchards contained many valuable thoughts. As to the relation between fertility of soil of the best crops, he said that when a bearing orchard begins to decline in the quality of fruit, lack of fertility is indicated. Orchards should be fed before the fertility is exhausted and the trees become stunted. It is a simple matter to understand that orchards must be fertilized for precisely the same reason that our grain fields and gardens are manured. The fruit removes the phosphoric acid, nitrogen and potash from the soil just the same as cereals and root crops do, and we must keep a liberal supply of available plant-food in the soil for the orchard if we expect profitable returns. In fact, it is more necessary to fertilize the orchard than it is our grain fields, for the reason that on most farms much of the grain produced is consumed by the stock, and through the manure-heap finds its way back to the land, while there is little or nothing that goes back to the soil from the fruit crop that is harvested year after year. We hear the question asked quite frequently, why is it that our orchards are not vigorous and long-lived as they used to be? It is chiefly because they are starved to death. Even the new lands we now clear up are not as rich in vegetable-mold and the mineral elements of the plant-food that make tree-growth as they were a half century ago. In fact, much of our woodland is now pastured until it is half-exhausted before the trees are taken off, or rather die off.

It requires about the same elements of plant-food to make an Apple-tree that it does a Pear or Peach, but when the fruits are analyzed we find quite a difference in their composition. For example:

	Phos. acid.	Potash.	Nitrogen.
100 bushels apples contain...	1 lb.	10 lbs.	7 lbs.
100 bushels pears, about.....	1½ lbs.	4 lbs.	5 lbs.
100 bushels peaches, about..	2½ lbs.	13 lbs.	6 lbs.

Thus we see that potash is the predominating element in apples and peaches, while nitrogen leads in pears. Apples need 2½ times and Peaches 3 times as much potash as Pears. It would not be good judgment to use precisely the quantities indicated in the above table to get an additional hundred bushels of fruit. The new wood-growth and foliage must be accounted for, as well as an allowance for some losses through fermentation, bleaching, etc. It is also impracticable to distribute any fertilizer so perfectly as to bring all of it within reach of the feeding rootlets of a tree. I would always advise a liberal use of such plant-food as we are sure our trees need, for a year lost in an orchard by failure to feed it is gone irretrievably.

Whatever we use to fertilize the orchard should be in readily available form, so that the trees can profit from it from the moment it is worked into the soil. Barn-yard manure is not the best thing to use by any means. Its nitrogen is partly available, but the potash and phosphoric acid are not. When barn-yard manure is applied, new wood will be formed in abundance, while the aim of the orchardist should be to have as little new wood as is consistent with bearing spurs, and these spurs will not form satisfactorily when there is too much nitrogen in the soil. Besides, fruit from orchards fed with improperly balanced manures not only keeps and ships badly, but also lacks flavor. The following formulas are suggested for bearing orchards: For Apples, ammonia, four; potash, six; phosphoric acid, two per cent. For Peaches, ammonia, four; potash, five, and phosphoric acid, six per cent. For Pears, ammonia, four; potash, two, and phosphoric acid, four per cent. Acidulated tankage is preferable for the ammonia, or fish scrap, if more convenient. The cheapest potash would be the muriate. The phosphoric acid is most useful as acid phosphate. From 500 to 600 pounds of fertilizer to the acre should be applied and worked well into the soil every year, whether the orchard bears or not.

When these available fertilizers are used the application should be made in early spring, and then there can be no loss of fertility during the winter from surface drainage or leaching. Clover can be grown and plowed under to supply the orchard with the nitrogen it needs, but the potash and phosphoric acid must be spread upon the land, having been obtained from whatever source is cheapest.

When orchards are on very rolling land, or land that washes badly, seed down to Clover and Orchard Grass and cultivate about the trees with the hoe for several years, or until they are old enough to bear. Such an orchard should never be pastured with any kind of stock, and the ground will remain loose and offer a nice mellow bed for the feeding rootlets of trees.

Mr. Stevens does not think it pays to renovate old orchards. The time and labor spent to get them into any sort of satisfactory condition will suffice to start a new orchard that will be a source of profit and satisfaction for half a lifetime.

Experiment Station, La Fayette, Ind. *J. Troop.*

From the St. Louis Botanic Garden.

THE so-called Mexican House here might be termed the Show House, since its permanent winter contents are usually in flower, and plants from the adjoining East India House are generally placed in it while blooming because its lower temperature lengthens their flowering season. The prettiest thing in it now is a plant of Passiflora racemosa princeps. It was planted out about a year ago in what looks a cramped position, being in a little border barely six inches wide; but the narrow root-space has been mellowed and enriched to a depth of two feet, and the vine has responded by sending out a stem fully thirty feet long and with numerous branches. It is now beginning to flower on the older part of the wood, the racemes being twelve to twenty inches long. The distinct trilobed foliage is ornamental, and the long, gracefully drooping racemes of hanging, bell-like coral buds, headed by sharply rayed flowers, are very effective. It will continue to flower throughout the winter. A thrifty vine of Bougainvillea glabra promises well for a good show of its fine blossoms in spring. Other vines in flower are Stigmaphyllon ciliatum, which has for some time been gay with bright clusters of Oncidium-like flowers; and Antigonon leptopus, that has been flowering for a long time, and still shows dense clusters of rose-pink, oddly shaped, little flowers. To the rafters of the southern side Cissus discolor clings, and seen from below the under side of the leaves is almost as brilliant as blossoms. The dwarf-growing Allamanda Williamsi is blooming, and will continue to do so all winter. It is planted out here in summer and flowers freely. In the East Indian House Strobilanthus Dyerianus is planted out under the middle bench, and throws up thick stalks that are tied to the

bench supports, and make an ornamental wall of foliage from the floor up the length of each side of the bench. Elsewhere, Bouvardias are in full bloom; the deep rose-colored flowers of Salvia involucrata make a nice show, and the air is sweet from masses of Jasminum grandiflorum.

Brighton, Ill. *Fanny Copley Seavey.*

Correspondence.

The Growth of Forest Trees.

To the Editor of Garden and Forest:

Sir,—This is a study in which I have been deeply interested, and I think there are few men who have given it longer or more careful attention. From boyhood I have been a planter of trees for both ornament and use. My father planted a Horse Chestnut-tree on the day I was born. It is now about about eighty feet high, and it requires four long arms to span its circumference, breast-high. This tree was sixty-eight years old the 14th of last May. I own forty acres of choice woodland, mostly Maple, Birch and Poplar, but interspersed with Pine, Spruce and Hemlock. Two of my Pines are over a hundred feet high and perfectly sound. On my lawn, twenty-two years planted, I have several Canoe Birches over one foot in diameter; and in front of another house, formerly mine, stand four Sugar Maples which I planted twenty-eight years ago, and which I cannot span, breast-high, with my arms.

The condition of our New England forest-trees has always deeply interested me; and there was a time, when locomotives were fired with wood and little or no coal was burned, that I feared for our forests. But that period has passed, and I feel able to concur with experts in woodcraft and extensive owners of woodlands, who now declare that there is to-day more and better standing timber in northern New England than ever before since lumbering was there begun. Many seem to fear that the forests are being robbed for the manufacture of wood-pulp. Observation, however, will show that Poplar-trees of the best size for wood-pulp can be grown in a very few years, six to ten; and I think it will not be long before the growing of such wood will become a regular and profitable business on our rocky mountain farms.

The growing of our native nut trees, Chestnuts, Butternuts, Hickorynuts, and even Beechnuts, will, I feel sure, soon become a profitable branch of farming. With proper treatment and care these nut trees can be grown in as large quantities by grafting, in some or all of its methods. It has long been so in Europe. I am rather too far north, or too elevated, for the Chestnut to succeed, but I have half a dozen fine young Butternuts in bearing, from nuts planted about twenty years since, and have recently planted out about fifty more.

The management of our Sugar Maples, when tapped, is being very much bettered; small bits for boring, more shallow holes, and careful after-treatment being now the rule with nearly all our better class of farmers. Agricultural journals are being much improved and better patronized, and their instructions intelligently followed by a rapidly increasing number of readers. Our rural schools are yet far from perfect, but they are improving, and this may be said also of our academies, which are giving more and more attention to the natural sciences, along with mathematics, but in all these lines there remains much room for profitable advance. One of the earliest pioneers in this direction was the late Dr. Ezekiel Holmes, a skillful teacher, who did not despise the working farmer, and was the founder and many years the editor of the *Maine Farmer*. I had the honor and pleasure of his acquaintance for many years, and my interest in horticulture and agriculture was greatly stimulated by his teachings.

Newport, Vt. *T. H. Hoskins.*

Utilizing Choke Cherries.

To the Editor of Garden and Forest:

Sir,—A note in your columns not long ago (see page 388), regarding the utilization of choke cherries, recalls the statement of a friend that in Armstrong County, Pennsylvania, among the jams, jellies and fruits in varied forms nothing was found nicer than choke cherry jelly. The fruit is used here occasionally for pies, and would be extremely popular were it not for the pits. Here is room for the invention of a diminutive cherry-stoner. With one the fruit of wild Black Cherry, Prunus serotina, might also become popular; at least, when other fruit is scarce.

An industry of considerable importance in this vicinity—and one which I am informed is to a great extent local—is the manufacture of jelly from fresh cider, which is boiled down in copper pans. Sweet apples are preferred, and yield a firm, clear and delicious article. Pound Sweets often refuse to "jell," but Early Harvest, Golden Sweet, etc., are always in demand. About two and a quarter bushels is the allowance for a gallon of jelly, though sour apples hold out better than sweet. About fifteen cents a gallon is charged for making it. It will keep for years. It takes the place of boiled cider.

B. L. P.

Variety Tests in the Experiment Stations.

To the Editor of Garden and Forest:

Sir,—In a recent editorial you put many true things concerning the worthlessness of much variety testing. It seems to me, however, you overlook the value of variety testing as a means of keeping the experimenter posted on the new varieties that are introduced. I find that in my situation this is an important feature if I am to meet the men interested in horticulture in this section and to teach the subject to best advantage in my classes. For this reason I make many tests of varieties each year, and know it pays me well to do so, although I publish but little in this line. The testing of varieties of apples, cherries, plums and pears in this state and section is a matter of much interest to our people, from the fact that we, perhaps, are more isolated in pomological matters than any other part of the country, and the introduction of hardy fruits into this section is regarded as a matter of first importance. We are sifting out the good from a long list of Russian and seedling fruits. The State Horticultural Society appoints ten members, who try the fruits sent them by this experiment station, and report to me direct. We also have a trial station at Owatouna, on the grounds of the State Primary School, devoted entirely to testing apples, plums, cherries and other tree fruits. This station is managed by an able orchardist, and is doing good work. There are also many bright men here who are experimenting along these lines. It seems to me that while the matter of variety testing can easily be overdone, it is a necessary part of the work at many experiment stations.

Experiment Station, St. Anthony Park, Minn. *Samuel B. Green.*

The California Buckeye.

To the Editor of Garden and Forest:

Sir,—Mr. Purdy's reference to the Californian Buckeye, Æsculus Californica (see p. 493), reminds me to say that I saw this shrub beautifully in bloom in the south of England in the summer of 1895. The exact date, as I see by my note-book, was July 16th. It was the first time I had seen it flowering, and it pleased me greatly. The flowers were flesh-colored or pink tinted, and made a fine display.

On the same grounds I met with another Californian shrub, hitherto unknown to me, Castanopsis chrysophylla. This was bearing little nuts, not unlike those of our eastern Chinquapin, but smaller, being no more than four feet high. I learn from Professor Sargent's account of this Golden-leaved Chestnut in *The Silva of North America*, that although it is a shrub at high altitudes, and a small tree in Oregon and the lower Sierras of California, it becomes a noble tree in the moist valleys of the California Coast Range, where good specimens reach a height of a hundred and fifty feet, with columnar trunks eight or ten feet through and towering to a height of eighty feet without a limb. Above this spreads the broad top, with leaves glossy green above and yellow on the lower surface.

The California Buckeye, too, in its best estate, is said to be a low tree, forming a wide dense head and strikingly beautiful.

Germantown, Pa. *Joseph Meehan.*

[See Garden and Forest (vol. iv., p. 528), where there is a figure of a tree of this Buckeye, with a spread of branches covering a circle sixty feet across. It is not hardy in the eastern states, but in the Mediterranean country, Australia and in other regions where the climate is similar to that of California, it will, no doubt, be planted largely in the future, as it is one of the most beautiful of North American trees when in flower.—Ed.]

Insect Pests in Madeira.

To the Editor of Garden and Forest:

Sir,—Dr. M. Grabham, while lately visiting the island of Madeira, wrote me (September 24th, 1896) as follows: "It is distressing to see the terrible ravages of the so-called 'blights'

here just now; the gardens are ruined by them, and the fruits, especially grapes, are being fast destroyed. The pests are chiefly an ant introduced from Brazil, which overruns everything, and various species of Coccidæ." A few of the Coccidæ and specimens of the ant were sent. The Coccidæ were, unfortunately, not in a condition to be determined, with the exception of Aspidiotus rapax of Comstock, which was in quantity on twigs and leaves of Stillingia cebifera, Linné. On the same plant were some young Lecanium, apparently L. hesperidum. On Myrtus communis were some very young scales, apparently of the same two species. On Sechium edule a cottony mass with only fragmentary remains, and puparia of some dipterous parasite. The ant I sent to Mr. L. O. Howard, who writes that Mr. Pergande has determined it as Iridomyrmex humilis.

Madeira is an island where little or no attention has been paid to economic entomology, but it is evident that there is an ample field for research. Had there been a competent resident entomologist to recognize and take measures against the several pests upon, or soon after, their introduction, no doubt much of the injury described by Dr. Grabham might have been prevented. Even in the absence of such an individual, any resident of the island who may read these lines can do good service by simply collecting specimens of the pests and sending them where they can be determined.

Agricultural College, Mesilla, N. M. *T. D. A. Cockerell.*

A Contagious Disease of White Grubs.

To the Editor of GARDEN AND FOREST:

Sir,—In connection with my notes on lawn-infesting insects, published in your journal (see page 472), it may be worth while to speak of some experiments made in the use of a fungous disease, caused by Isaria densa, against white grubs. The experiments were first made in France and Germany, and tube cultures have been advertised for sale under the name of "Rose muscardine." According to the directions it was necessary to gather a lot of one hundred or more white grubs and inoculate them carefully with the culture. Then they were to be buried in a specially prepared bed, to remain until they were properly "mummified." Then two or three hundred more white grubs were to be collected, put into this same bed with the mummified grubs, and after these in turn had become destroyed, specimens were to be buried in the infested land at intervals of a foot or so apart. If white grubs were continually collected and placed in the bed of infestation, a supply of mummies, more or less constant in character, could be maintained. It is obvious that this process, while simple enough for a laboratory experiment, is altogether too complicated for use by the owner of a small lawn or garden, and it has the disadvantage of not becoming available for a considerable time after the infestation tubes are received. By the time the owner of a lawn has gathered several hundred white grubs in order to start his disease-bed, it may happen that there are no more of them to be killed off. Furthermore, experiments made in Illinois in the laboratory of Professor S. A. Forbes indicate that the disease loses virulence very soon. It is fair to say that an effort is being made to simplify the use of the germs, and it is now advised that the first culture be made on boiled potatoes, which it seems will support the Isaria. By planting the infected potatoes in a prepared bed and covering with earth until the mass has become thoroughly filled with the fungus, it can be taken out entire and spread broadcast over infested lawns. The object is to distribute the disease everywhere throughout the soil, that it may come into contact with the white grub larvæ. Even as the matter stands at present, however, the use of the disease is complicated if it is necessary to employ it from the cultures. If it were possible to purchase at a reasonable rate the dried cakes of material ready to be spread upon the land, the use of this disease might prove feasible. Unfortunately, however, up to the present time it has not been proved that the American white grub is as readily susceptible to the disease as the European, and for the present, at least, resort must be had to other measures.

Rutgers College. *J. B. Smith.*

Recent Publications.

The Survival of the Unlike: A Collection of Evolution Essays suggested by the Study of Domestic Plants. By L. H. Bailey. New York: The Macmillan Co. 1896.

This is an attempt, and perhaps the first systematic attempt on any important scale, to extend the theory of evolution to the practice of horticulture. Few evolutionists have theorized on the vegetable world, speculation in this field having been directed almost entirely to animals rather than to plants. No American writer, at least, has ever assumed any bold position in relation to the development of vegetable life. Darwin studied the life of plants under cultivation as well as under natural conditions, but he did this primarily, and almost entirely, to gather data for establishing and enforcing the general philosophy of evolution, and not to explain cultural practice. Nearly all that is new in the art of gardening has come from direct experiment. In these essays the attempt is made to attack horticultural problems from the opposite side. We do not mean by this that Professor Bailey advocates the abandonment of direct experiment as a help to practice, but rather that this book takes up facts already known as data, and then attempts to explain by reasoning from these data what particular lines of experiment and practice offer the greatest promise. These essays, which have been read at various times before horticultural societies, were prepared primarily for horticulturists. But it is plain that they were prepared also for evolutionists, and in the preface to this book Professor Bailey gives some reasons why he usually selected as a subject for discussion before such audiences some topic associated with the evolution of plants. In the first place he is convinced that many of the common questions which puzzle cultivators can only be answered by appealing to the evidences of evolution. Again he thought that it would be helpful to persons who deal with plants and animals and lead a rural life to have some knowledge of modern speculations in the evolution theory and of the methods of research which they suggest. And finally he wished to make a record of a great class of common facts which have a vital relation with organic evolution, but which are almost entirely overlooked by students and philosophers.

In the first chapter of the book we find an expansion of the thesis that development in the plant world has come about by very slow and gradual transformation, rather than by jumps or sports. This, however, is part of the treatment of the main proposition that the fittest survives because it is unlike everything else. Therefore the study of differences which arise from all sorts of environment, and as a complex resultant of hundreds of forces from without and from within, ought to be the controlling method in investigating the progress of life. A new type with its divergences of character from the old may find a line where the resistance to expansion and growth is less than it was to the parent, and therefore it spreads rapidly under changed conditions. That is, the new types strike out and find fields where competition is less active than in the old ones. Another thesis, which is treated so freshly as to make it appear new, relates to bud variation. In this Professor Bailey attempts to prove that variation of the bud is no more mysterious than variation of the seed, for the reason that in an important sense every branch is a distinct individual which has been exposed to a different set of conditions, and it therefore has the power of reproducing its essential characteristics.

It is not our intention, however, to give any analysis of the contents of the book. In fact, being a collection of addresses delivered at different times and on different occasions, it has not the consecutiveness and unity which would be expected in a systematic treatise, although for some purposes the book is better for its repetitions and its treatment of subjects from different points of view. Certainly the essays must have been stimulating to the audiences of working cultivators who listened to them, since they were prepared for men brought into constant contact with vegetable life, and therefore compelled to observe the phenomena of vegetable growth, but without the training or habit of generalizing or making deductions from facts. A glance at the table of contents will show what an interesting range of topics is embraced in the discussions and will convince any one that it is a good book to put into the hands of any intelligent farmer or gardener. It will give

him new reasons for much established cultural practice, and it will certainly set him to thinking seriously over many problems which remain to be solved.

Notes.

The books on landscape-gardening collected by Henry Sargent Codman and Philip Codman have been presented by their parents, Mr. and Mrs. James M. Codman, of Brookline, Massachusetts, to the Boston Public Library, where they will be placed in a special alcove to be devoted hereafter to works on this subject. The collection consists of some three hundred and fifty volumes, among them many old works of extreme rarity.

Forced dandelion is now seen among the more tender vegetables in a large assortment of holiday offerings and sells for twenty cents a quart. Slender young onions, from New Orleans, cost seven cents a bunch, and tiny radishes, from near-by hothouses, the same price. Lettuce, from Boston, brings ten cents a head, and showy cucumbers, perfectly grown, also from Massachusetts, readily command twenty cents each. Smooth and evenly colored tomatoes from Pennsylvania hothouses cost forty cents a pound, and mushrooms from Long Island sixty cents.

According to the Journal of the Agricultural Bureau of South Australia, Cork Oak trees of good quality have been grown in that region, both soil and climate proving congenial. One drawback to the more general cultivation of the tree is that it has been difficult to get the acorns which come from Europe to germinate, but now the trees originally planted in South Australia are fruiting abundantly, so that there will be little difficulty in obtaining seedlings. The trees planted in Mount Lofty about forty years ago are growing vigorously and they are old enough now to produce a crop of cork.

Dr. Rothrock calls attention in *Forest Leaves* to the observation of Dr. Evermayer for the Bavarian Government, who declares that the evaporation of moisture from a forest area, including transpiration from the leaves, exceeds by fifty per cent. the evaporation from a water surface in the open, and if, therefore, we cut off great areas of forest it is not improbable that the surrounding atmosphere is much less humid, and for this reason the ground will dry out much more rapidly. This will account to a certain extent for the killing quality of the droughts in some recent years. A diminished rainfall alone will hardly account for their severity, but if we couple with this the fact that evaporation from the ground is more rapid, we have some additional reasons for the extreme dryness which has prevailed.

A correspondent inquires if it makes any particular difference what staminate varieties of Strawberries are set among pistillate plants in order to fertilize them. Whether the pollen parent does anything to modify the size, flavor or color of the berry is a question that has been very energetically discussed, but growers pay little attention to the quality of the fruit of the perfect-flowered plants and a good deal to the question whether they are strong growers and abundant producers of pollen. It is essential, however, that the plants which produce this pollen should blossom at the same time with the varieties which they fertilize. For example, Mr. Paddock states in a recent bulletin of the New York Experiment Station that Michel's Early would not be a proper variety to plant with Bubach, because the first blossoms of the latter will hardly be open before those of the former are in full bloom or past their best.

Among the plants which are to be sent out by the California Experiment Station next year will be a few seedling Silk-Cotton trees in small pots for trial in the warmer districts of that state. The lustrous light fibre known as "silk-cotton" and used in upholstery is a product of this tree, Eriodendron anfractuosum, and if it can be grown in that state it would be a valuable addition to the economic plants. Since the tree is a native of the southern part of India, however, it cannot be expected to flourish except in places which are entirely frostless. The Carob-tree, Ceratonia siliqua, has been raised from seed in Alameda County and has already borne fruit. This tree is about as hardy as the Orange and valuable, owing to its drought-resisting qualities, for planting on dry hillsides as well as on richer lands, where it produces excellent food for cows and swine. It is a handsome tree, the true Algaroba or St. John's Bread of the Mediterranean regions. A late bulletin of the Experiment Station at Berkeley announces that several pods of the Carob-tree will be mailed to applicants for five cents.

Nine cargoes of Oregon fir have recently been loaded at Port Blakely, Washington, to be used in the construction of a dry dock in Plymouth, England. According to the *Timber News*, of Liverpool, the Creedmore carried 1,100,000 feet, the Kennebec 1,500,000 feet, the John Briggs 1,430,000, and so on, making a total of 11,000,000 feet. It must be a spacious dry dock which will need so much timber and plank, for, as the *Northwestern Lumberman* remarks, this will be enough to fill up a big Chicago wholesale lumber-yard. Besides the small lumber that has started on its long journey around Cape Horn, there are more than 10,000 pieces of timber which range from twelve to twenty-four inches square and from forty-five to eighty-three feet long, and the *Lumberman* remarks that nowhere on the earth can such a lot of timber be found near water where such large ships can be loaded. The deep waters of Puget Sound enable ships to take these enormous cargoes at the very mill wharves.

Concord and Catawba grapes are still quite plentiful and sell for fifteen and twenty cents for a basket holding four pounds of the fruit. Trimmed bunches of Almeria or Malaga grapes cost twenty-five to thirty-five cents a pound. The direct importation of these Spanish grapes is confined to October and November, though a few lots come by way of Liverpool in December. This year the receipts in this city from Spain amounted to 139,339 barrels of about sixty pounds each, and prices were remarkably even throughout the unusually short selling season of five weeks. One shipper realized an average of $5.25 a barrel on all the grapes forwarded, while an invoice of 1,000 barrels netted the exporter $6.12½ a barrel. The highest price reached during the season for an exceptionally fine lot was $11.12½ a barrel. Large-berried Gros Colman grapes are coming from Liverpool in perfect condition, nine of the immense bunches in a box about fifteen inches square, suspended from three slats and well held in place with cork-dust. A pound of this showy fruit costs $1.75 to $2.25.

Never before have citrus fruits reached this city from so many sections, and the range and variety is, consequently, remarkable. A choice of oranges may be had from Florida, Jamaica, Cuba, the Bahamas, California, Arizona, Mexico and the Mediterranean. Grape-fruit is coming from Florida and Jamaica, and shaddocks from the latter place. Grape-fruit sells for $1.00 to $2.00 a dozen, Florida oranges sixty to seventy-five cents, and California Navels for the same price, oranges from Jamaica costing slightly less. Mandarins, light-colored and of good size, with distinctive musky flavor, come from Sicily and from Florida, and sell for thirty to sixty cents a dozen. Smaller Tangerines, of deep rich color, reach us from the same state and from Jamaica and California, and their comparative scarcity here has induced large shipments from Japan. This seedless fruit from Asia is considered of better flavor than that from California, but not equal to the Florida fruit, which commands sixty-five cents a dozen. Valencia oranges are exceptionally good this season, and sell as high as $5.50 a case at the wholesale auctions, the best Messina oranges reaching $2.25. Lemons, from Spain and Sicily, are of good quality, plentiful and unusually cheap for the holiday season, costing fifteen to twenty-five cents a dozen. The immense total quantity of oranges alone is indicated by the fact that now, at the beginning of the season for Mediterranean oranges, 32,700 cases of Valencias have already been received at this port, while up to December 17th 214,124 barrels and 29,926 boxes of Jamaica oranges have arrived.

We have lately received from Dr. Franceschi an interesting note in regard to Mr. Kinton Stevens, an Englishman by birth, who came to California more than twenty years ago, and began planting at Montecito specimens of Palms and tropical trees which have made his garden one of the most attractive and interesting in southern California. Mr. Stevens died recently, but his garden contains such treasures as two plants of Cocos plumosa, thirty-five to forty feet high; an Erythea armata, which has bloomed for the first time in cultivation; a Jubæa spectabilis, twenty feet high, and flowering specimens of various other Palms. Besides this, the garden displays Mango-trees in fruit with Eugenia Brasiliensis and Monstera deliciosa, which have also ripened fruit here for the first time in California. He was entrusted by the Board of Park Commissioners of San Francisco to collect Palms, Tree Ferns and other interesting plants from Hawaii, in which he was very successful, and he was a pioneer in planting Avocado Pears in the state. Mr. Stevens was cut off in the midst of his usefulness, but his memory will live in the beautiful plants with which he enriched the gardens of his adopted state.